

CLAIMS

WHAT IS CLAIMED IS:

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1. An optical catheter connector comprising:
  - a hollow catheter ferrule having an opening;
  - 5 a fiber connector rotatably housed inside the catheter ferrule an optical fiber positioned along a rotational axis of the fiber connector; and
  - a fiber ferrule attached to the fiber connector, wherein the fiber ferrule supports one end of the optical fiber.
- 10 2. The catheter connector of claim 1, wherein the fiber ferrule extends outwardly from the opening of the catheter ferrule.
3. The catheter connector of claim 1, further comprising a connector bushing housed inside the catheter ferrule and attached to the fiber connector.
- 15 4. The catheter connector of claim 3, wherein the connector bushing has at least two slots, the catheter ferrule has a slot opening corresponding to each slot on the connector bushing, and the catheter connector further comprises:
  - at least two lock tabs attached to the outer surface of the catheter ferrule;
  - and
  - a gripper attached to each lock tab and adapted to engage one of the slots on the connector bushing through the corresponding slot opening in the catheter ferrule.
- 20 5. The catheter connector of claim 4, wherein the lock tabs are made of polycarbonate.

6. The catheter connector of claim 4, wherein the lock tabs are made of plastic.

7. The catheter connector of claim 1, further comprising a drive shaft attached at one end to the fiber connector, wherein the drive shaft encloses a length of the optical fiber.

8. The catheter connector of claim 7, wherein the driver shaft has a high torsional stiffness and a low bending stiffness.

9. The catheter connector of claim 1, further comprising a seal sealed around a portion of the fiber connector.

10. The catheter connector of claim 9, wherein the seal is an 'O' ring.

11. The catheter connector of claim 10, further comprising an 'O' ring housing fitted around the 'O' ring, wherein the 'O' ring housing is housed inside the catheter ferrule.

12. The catheter connector of claim 11, wherein the portion of the catheter ferrule enclosing the 'O' ring housing has an inner wall that is shaped to prevent the 'O' ring housing from rotating inside the catheter ferrule.

13. A motor unit comprising:  
a hollow motor nose having an opening;  
a rotary shaft rotatably housed inside the motor nose;

a fiber-to-fiber adapter attached to the rotary shaft, wherein the fiber-to-fiber adapter comprises a split sleeve having two ends and positioned along a rotational axis of the rotary shaft;

an optical fiber positioned along the rotational axis of the rotary shaft; and

5 a fiber ferrule supporting one end of the optical fiber, wherein the fiber ferrule is inserted into one end of the split sleeve.

14. The motor unit of claim 13, wherein the opening of the motor unit has slots adapted to engage lock taps of a catheter connector.

15. The motor unit of claim 13, wherein the fiber-to-fiber adapter comprises 10 retaining clips adapted to retain a fiber connector of a catheter connector within the fiber-to-fiber adapter.

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*AI* 16. An optical catheter connector, comprising:  
a flexible hollow catheter ferrule;  
a rigid retainer housed inside the catheter ferrule, wherein the retainer has  
15 at least two cutouts;  
a fiber connector housed inside the retainer;  
an optical fiber positioned along a rotational axis of the fiber connector;  
and;  
a connector bushing housed inside the retainer, wherein the connector  
20 bushing is attached to the fiber connector and the connector bushing has ribs on its outer surface positioned at the cutouts of the retainer.

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17. The catheter connector of claim 16, wherein the openings in the retainer are elliptical.

18. The catheter connector of claim 16, wherein the catheter ferrule is made of a flexible polymer.

5 19. The catheter connector of claim 16, wherein the retainer is made of polycarbonate.

20. The catheter connector of claim 16, wherein the retainer is made of plastic.

21. The catheter connector of claim 16, further comprising a shield surrounding the other surface of the catheter ferrule.

10 22. An optical catheter connector comprising:  
a hollow catheter ferrule having an opening;  
a fiber connector rotatably housed inside the catheter ferrule an optical fiber positioned along a rotational axis of the fiber connector; and  
a connector bushing housed inside the catheter ferrule and attached to the  
15 fiber connector.

23. The catheter connector of claim 21, further comprising a shield surrounding the other surface of the catheter ferrule.

24. The catheter connector of claim 22, wherein the catheter ferrule has drain openings for draining excess fluid from the catheter ferrule.

25. The catheter connector of claim 22, further comprising:  
a tube attached at one end to the fiber connector, wherein the optical fiber  
runs through the tube; and  
a seal sealed around the tube.

5 26. The catheter connector of claim 25, wherein the seal is an 'O' ring.

27. The catheter connector of claim 26, wherein the tube comprises stainless  
steel.

10 28. The catheter connector of claim 26, further comprising an 'O' ring  
housing fitted around the 'O' ring, wherein the 'O' ring housing is housed inside the  
catheter ferrule.

29. The catheter connector of claim 28, wherein the portion of the catheter  
ferrule enclosing the 'O' ring housing has an inner wall that is shaped to prevent the 'O'  
ring housing from rotating inside the catheter ferrule.

15 30. A motor unit comprising:  
a hollow motor nose having an opening;  
a plurality of spring-loaded plunger radially spaced along the opening of  
the motor nose;  
a rotary shaft rotatably housed inside the motor unit;  
a fiber-to-fiber adapter attached to the rotary shaft, wherein the fiber-to-  
20 fiber adapter comprises a split sleeve having two ends and positioned along a rotational

axis of the rotary shaft;

an optical fiber positioned along the rotational axis of the rotary shaft; and

a fiber ferrule supporting one end of the optical fiber, wherein the fiber ferrule is inserted into one end of the sleeve.

5 31. The motor unit of claim 30, further including a washer secured to the motor nose and surrounding the fiber-to-fiber adapter.

32. The motor unit of claim 31, wherein the washer is a Belleville washer.

33. The motor unit of claim 31, wherein the washer is a wave washer.

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